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Early Mobilization in the Intensive Care Unit: Help or Hype?

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We have learned over the last decade that survivors of critical illness are left with multiple impairments. Resolution of physical deficits, cognitive dysfunction and return to pre-intensive care unit (ICU) levels of function are frequently prolonged (1), and complete recovery may never occur. Skeletal muscle weakness acquired during critical illness (ICU acquired weakness, ICUAW) continues to be a major clinical problem. Importantly, recent studies show that ICUAW is associated with both acute and long-term morbidity and mortality (2–4). While risk factors have been identified, the diagnosis of ICUAW is often delayed, the clinical tools used to assess weakness are imprecise, and the treatments are virtually non-existent. Moreover, most existing strategies for preventing or treating ICUAW employ models used to improve muscle strength and endurance in normal healthy individuals and/or the elderly. Currently, one of the most popularized paradigms is early mobilization (EM). This approach gained attention after several studies suggested that mobilizing ICU patients improves outcomes (5–7). Numerous reports detail the feasibility of EM, but the barriers remain myriad.

In this issue, Dr. Hodgson and the TEAM Study Investigators present results from a pilot study(8) performed to assess if a higher “dose” of physical therapy (PT) delivered early during critical illness would be feasible and improve mobility milestones in mechanically ventilated patients compared to a standard care group. This intervention, “early goal directed mobilization” (EGDM), required subjects to actively participate in PT at the highest level they could achieve at the beginning of the first session, followed by gradual reduction in activity as tolerated. Session durations were targeted for one hour daily for 7 days in the EGDM, and similar to most EM studies, the intervention required a mobility team (an ICU physiotherapist, an allied health assistant and a nurse). Subjects randomized to standard care received PT at the discretion of a dedicated ICU physiotherapist, consisting initially of passive movements followed by graded increases in active therapy. Of note, these highly

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respected investigators who are champions of EM and world leaders in this field executed the protocol in five ICUs across Australia and New Zealand. Results show that EGDM is feasible and safe, and higher levels of activity (measured using the ICU mobility score) and longer durations of exercise were achieved with EGDM. After 7 days, more patients in the EGDM group were able to walk. Interestingly, this was achieved with a median of 20 minutes/day of active therapy in the EGDM group while those in the standard group had a median of 7 minutes/day of active exercise. Although not sufficiently powered to detect differences, duration of mechanical ventilation, ICU and hospital length of stay, and 6 month follow up data were not different between the two groups.

The authors attempt to address a potentially important issue regarding the optimum exercise dose for critically ill ICU patients. However, the results from the AVERT study suggest that in stroke patients, EM is harmful (9). In addition, Moss et al recently reported that an intensive PT rehabilitation program provided no benefit in long term outcomes or in ICU or hospital free days compared to standard care (10). In their very thoughtful discussion addressing these negative results, the authors state “it is possible that an intensive PT program truly does not yield better physical function when compared to a standard of care program” (10). Given these findings, it seems reasonable to wonder whether EM is helpful, or if this persistent push for widespread implementation of EM for all critically ill patients is simply hype.

Many questions remain regarding the utility of EM as a rehabilitative strategy for critically ill mechanically ventilated patients. Does the time, effort, and additional personnel required for EM benefit our patients? Is EM good for all critically ill patients? Intuitively, we say yes; exercise is good, so it must be good for critically ill patients. Proponents of EM might suggest that the issues are determining what form of PT works, how much PT is needed, and when PT should be initiated. Is it reasonable to continue along this path when we still have significant issues with oversedation and ICUs that have not adopted even the most basic EM protocols because of real or perceived barriers (11)? How many large trials of exercise in the ICU will be required to unequivocally verify that EM results in clinically important and patient-centered outcomes? If a study emerges with robustly positive results, could the approach be used universally, or would the next study invalidate the positive study, clouding the issue again?

Perhaps it is time for us to step back and reassess. The pathophysiology of ICUAW is complex and cannot be entirely explained by immobilization. Both pre-clinical and clinical studies provide evidence that multiple contributing pathophysiologic mechanisms are involved in the evolution of ICUAW. Should we continue to ignore these data and limit our exploration merely to delineating the best exercise regimen for our ICU patients? Patients are septic, with respiratory failure, renal failure, and other organ dysfunctions. Importantly, a significant number of these patients cannot be weaned off mechanical ventilation because of diaphragm weakness (2), a critical component of ICUAW that has received little attention. Certainly one could argue that liberation from mechanical ventilation eliminates one of the major barriers for implementing a host of interventions that might improve critical illness-induced physical and cognitive dysfunction.

Reducing ICU immobilization is a laudable goal, but we should not be so visionless to think that PT is the only therapeutic option for ICUAW or that exercise is the panacea for eliminating most of the disabilities in ICU survivors. A recent elegant review points out that our patients are both sick and weak (12). Therefore, we are compelled to consider all of these factors in designing preventive and rehabilitative strategies. There are answers, but we must be broad-minded in our search. New therapies will require careful consideration of the existing science, generation of new data that unfolds yet undiscovered mechanisms, and most importantly, ingenuity.

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